

INEEL Accelerated Site Technology Deployment Integrated Decontamination and Decommissioning Project

Mid-Year Review

Richard Meservey
Morgantown, WV

Ann Marie Smith
May 25-27, 1999

Project Goals

- Deploy innovative, proven technologies
- Improve D&D operations at three DOE sites
 - INEEL
 - Fernald
 - Chicago
- Assist D&D operations
 - Obtain technologies
 - Train workers
 - Identify deployment opportunities
- Establish new baseline technologies at other sites
- Decrease D&D costs
- Accelerate D&D schedules

Technical Approach

- Select best of the technologies from first three Large Scale Demonstrations
- Identify technology needs at the three sites (i.e. INEEL, Fernald, Chicago)
- Analyze schedule requirements for these needs
- Apply or deploy these improved/innovative technologies to a variety of D&D projects

Baseline Technologies

- Metal cutting with various torches and saws
- Digging up pipe without inspecting it first
- Short stay-times for workers in hot weather
- Minimal concrete demolition within buildings
- Manual radiation surveys
- Tube and clamp scaffolding
- Small, expensive, hard sided waste containers
- Sawing/torch cutting of piping
- Manual determination of waste volumes/planning

End User Schedule Requirements

- Fernald
 - Removal of nine facilities during FY-98 and FY-99
- INEEL
 - Decommissioning of eight facilities during FY-98 and FY-99
- Chicago
 - Bioshield and concrete removal operations at CP-5 during FY-99

Communications Effectiveness

- Good communications have greatly improved the effectiveness of these technology deployments
 - Display at Spectrum '98
 - Formal presentations
 - Spectrum '98
 - Intermountain Conference on the Environment
 - Waste Management '99
 - Website (<http://id.inel.gov.idd/>)
 - Videos, photographs, and fact sheets

Communications Effectiveness - cont.

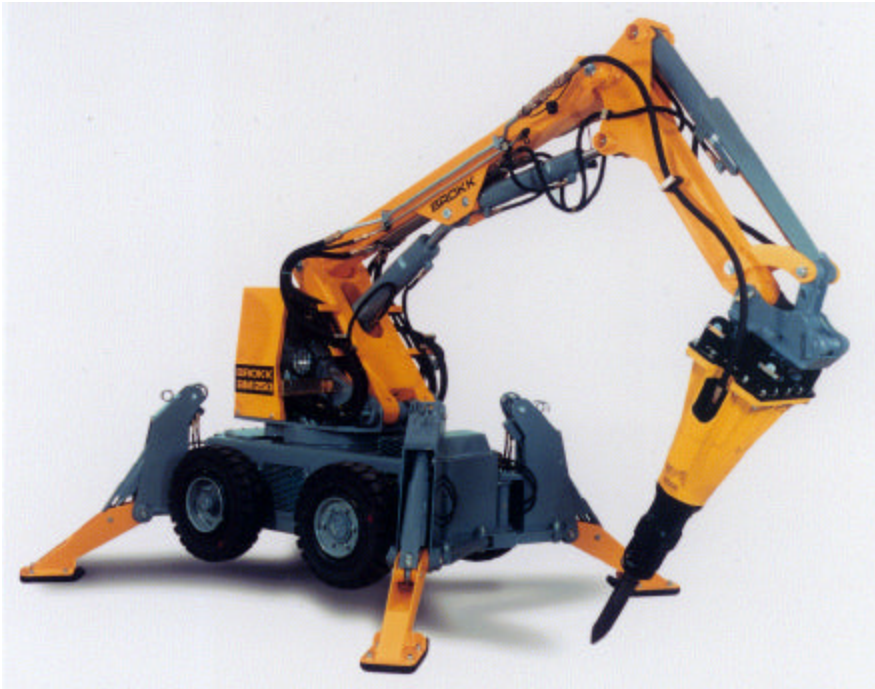
- Regular conference calls
- Attend D&D operations staff meetings
- FY-98 Year-end Report
- D&D operations personnel now actively seek our input to their technology selection process and D&D planning

Snap Together Scaffolding

- Easy to use
- Assemble six times faster than baseline
- Automatic locking mechanism
- No tools required
- Excel Modular Scaffold and Leasing Corp.



BROKK 250BM Demolition Robot



- Mobile demolition robot
- Controlled by tether or radio remote control
- Multiple end-effectors:
 - Scabbler
 - Hydraulic shear
 - Hammer
 - Grapple
 - Bucket
- Decreases cost by 93%
- 18 times faster
- Significantly increases safety
- BROKK Holmhed
Systems AB

Selecting Technologies for Improved Field Performance

- Proven performance from previous Large Scale Demonstration Projects
- Large delta over baseline for cost and performance
- Highly deployable, i.e. many projects or tasks need the improved technology
- Moderate cost, large return on investment
- Apply to current and future D&D work

STCG Needs

Argonne National Laboratory

- CH-DD04-99 - Improved Worker Protection Equipment
- CH-DD05-99 - Size Reduction of Large Concrete Structures
- CH-DD06-99 - Size Reduction of Massive Metal Structures

Idaho National Engineering and Environmental Laboratory

- ID-3.2.46 - Soft-Sided LLW Bulk Disposal Container
- ID-7.2.03 - Concrete Decontamination
- ID-7.2.05 - Waste Recycle
- ID-7.2.06 - Remote Characterization
- ID-7.2.07 - Remote Demolition
- ID-7.2.08 - Robotics for D&D
- ID-7.2.12 - Cutting Equipment that is Capable of Cutting Large Items in Above Ground and Underground Structures as well as Underwater
- ID-7.2.21 - Removal of Two Reactors as Single Units

Fernald Environmental Management Project

- OH-F010 - Safe and Efficient Process Piping and Conduit Dismantlement
- OH-F017 - Improved (cool temperature) PPE for Working in Warm Temperature Environments (D&D)
- OH-F027 - Improved Equipment Dismantlement

Technologies Address STCG Needs

Technology	STCG Need(s) Addressed
Oxy-Gasoline Torch	CH-DD06-99 – Size Reduction of Massive Metal Structures OH-F010 – Safe and Efficient Process Piping and Conduit Dismantlement OH-F027 – Improved Equipment Dismantlement ID-7.2.12 – Cutting Equipment that is Capable of Cutting Large Items in Above Ground and Underground Structures as well as Underwater
DDROPS	ID-7.2.07 – Remote Demolition ID-7.2.05 – Waste Recycle ID-7.2.21 – Removal of Two Reactors as Single Units
Personal Ice Cool Suits – PICS	CH-DD04-99 – Improved Worker Protection Equipment OH-F017 – Improved (cool temperature) PPE for Working in Warm Temperature Environments (D&D)
BROKK 250	CH-DD05-99 – Size Reduction of Large Concrete Structures ID-7.2.03 – Concrete Decontamination ID-7.2.07 – Remote Demolition ID-7.2.08 – Robotics for D&D ID-7.2.12 – Cutting Equipment that is Capable of Cutting Large Items in Above Ground and Underground Structures as well as Underwater
GammaCam	ID-7.2.06 – Remote Characterization
Snap together Scaffolding	ID-7.2.08 – Robotics for D&D
Track-Mounted Shear	OH-F010 – Safe and Efficient Process Piping and Conduit Dismantlement OH-F027 – Improved Equipment Dismantlement
Hand-Held Shear	OH-F010 – Safe and Efficient Process Piping and Conduit Dismantlement OH-F027 – Improved Equipment Dismantlement
Soft Sided Containers	ID-3.2.46 – LLW Bulk Disposal Container
Concrete Crusher	ID-7.2.05 – Waste Recycle ID-7.2.07 – Remote Demolition

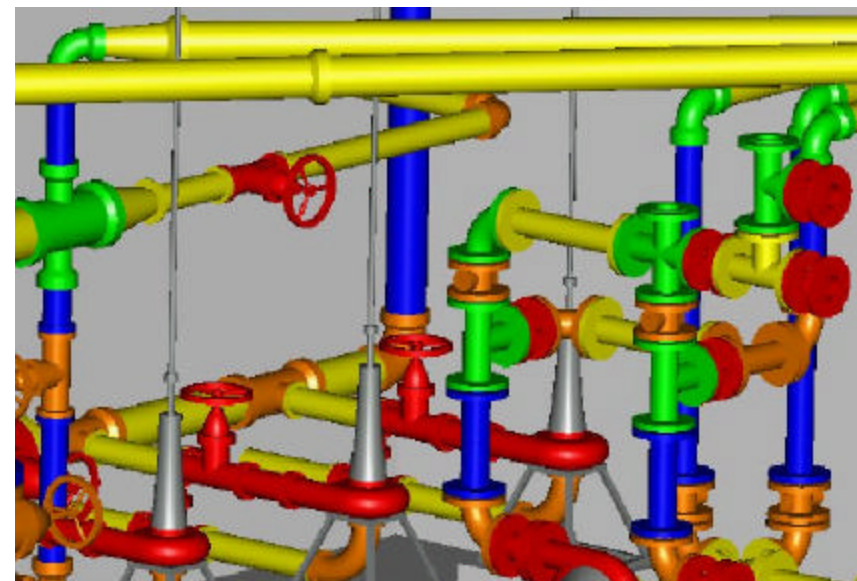
Soft Sided Containers



- Packaging of Low Level Waste/Debris
- Reduces cost significantly
 - 260 cubic foot capacity compared to 96 cubic foot
 - \$380 per container vs. \$750 for metal boxes
 - Decreases total cost by 69%
- Molds around itself for void volume reduction
- DOT IP-1 Approved
- Transport Plastics, Inc.

Decontamination, Decommissioning and Remediation Optimal Planning System (DDROPS)

- Solid geometric modeling and optimization technique to:
 - Identify locations for segmenting contaminated materials,
 - Determine packaging routines resulting in improved packaging densities,
 - Minimize radiation exposure,
 - Create inventory of waste box contents
- INEEL Patent Pending



Benefit Areas

- Cost
- Schedule
- Radiation Dose
- Overall Safety
- Waste Volume

Performance Advantages

ASTD Technology	Benefits
Oxy-Gasoline Torch	<ul style="list-style-type: none"> -Cost – 43% decrease for 2" carbon steel -Schedule – 30% decrease in cutting time for 1" and 39% decrease for 2" -Radiation Dose – Decreased -Overall Safety – Increased -Waste Volume – Decreased
DDROPS	<ul style="list-style-type: none"> -Cost – Decreased -Schedule – Decreased -Radiation Dose – Decreased -Overall Safety – Increased -Waste Volume – Decreased
Personal Ice Cool Suits (PICS)	<ul style="list-style-type: none"> -Cost – 46% decrease -Schedule – 29%-57% more efficient -Radiation Dose – Decreased -Overall Safety – Increased -Waste Volume – Decreased
Robotic Demolition (BROKK)	<ul style="list-style-type: none"> -Cost – 93% decrease -Schedule – 18 times faster -Radiation Dose – Decreased -Overall Safety – Much Increased -Waste Volume – Decreased
GammaCam	<ul style="list-style-type: none"> -Cost – 18% decrease -Schedule – 2.7 times faster -Radiation Dose – Decreased -Overall Safety – Increased -Waste Volume – Decreased

Performance Advantages - cont.

ASTD Technology	Benefits
Snap Together Scaffolding (Excel)	<ul style="list-style-type: none"> -Cost – 60%-70% decrease -Schedule – 63% reduction in assembly time and 67% reduction in disassembly time -Radiation Dose – 60%-70% ALARA dose savings -Overall Safety – Increased -Waste Volume – Decreased
Soft-sided Containers	<ul style="list-style-type: none"> -Cost – 69% decrease -Schedule – 1.75 times faster -Radiation Dose – Decreased -Overall Safety – Increased -Waste Volume – Decreased
Concrete Crusher	<ul style="list-style-type: none"> -Cost – 49% decrease -Schedule – Decreased -Radiation Dose – Not Applicable -Overall Safety – Increased -Waste Volume – Decreased
Track-mounted Shear	<ul style="list-style-type: none"> -Cost – Decreased -Schedule – Decreased -Radiation Dose – Decreased -Overall Safety – Increased -Waste Volume – Same
Hand-Held Shear	<ul style="list-style-type: none"> -Cost – Decreased -Schedule – Decreased -Radiation Dose – Decreased -Overall Safety – Increased -Waste Volume – Same

Personal Ice Cooling System

- Keeps radiation workers cool
- Fits under PPE
- Decreases cost
 - For 70 - 80° F, saves 39%
 - For > 85° F, saves 66%
 - For > 85° F, payback time = 9 hours
- Significantly increases productivity
- Delta Temax, Inc.



Oxy-Gasoline Torch



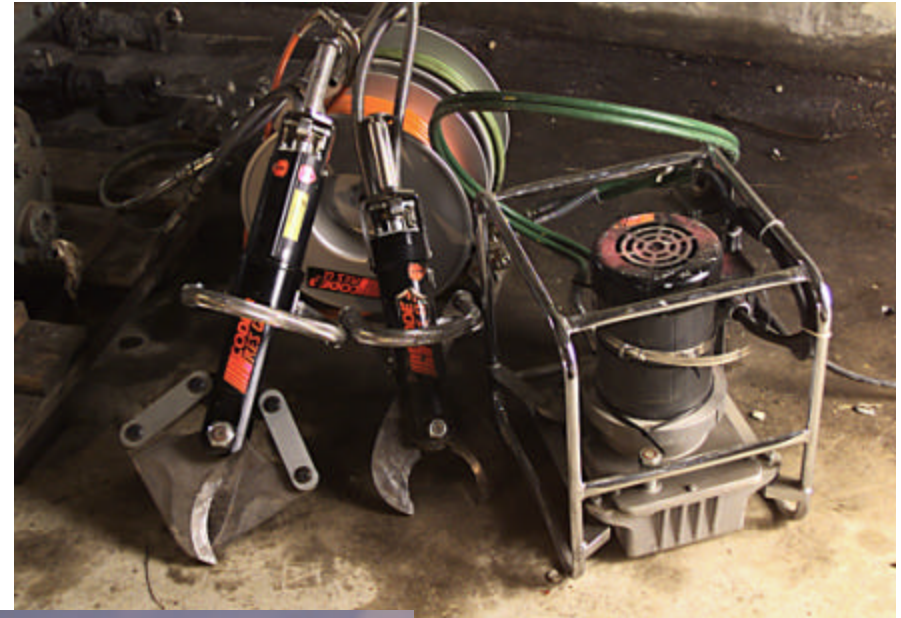
- Cuts carbon steel
- Decreases cost by 43% (2" carbon steel)
- Decreases schedule by about 35%
- Petrogen, Inc.

Significant Accomplishments - FEMP

- Deployed 3 technologies
 - Hand-held Shear
 - Oxy-gas Torch
 - Track Mounted Shear
- Removed 9 structures
 - Propane Storage Shelter(38A)
 - Cylinder Filling Station (38B)
 - Railroad Engine House (24B)
 - Harshaw Digestion Fume Recovery (2F)
 - Refrigeration Building (3G)
 - Utility Shed East of Trailer (45B)
 - Incinerator Sprinkler House (39C)
 - Gas Metering Building (22A)
 - Plant Eight Drum Washer (8F)

Hand-Held Shear

- Self-powered shear
- Cuts 20% faster
- Reduces exposure to airborne lead
- ResQ Tek



6945-D0006

Track-Mounted Shear



- Demolition tool
- Increases worker safety
- Reduces exposure to airborne lead
- Improves productivity by automating process
- John Deere, Pemberton, and Tiger Mfg.

Significant Accomplishments - INEEL

- Deployed 4 technologies
 - Oxy-gas Torch
 - Snap Together Scaffolding
 - Gamma Cam
 - Soft-sided Containers
- Assisting with D&D of 8 facilities
 - Security Training Facility (CFA STF)
 - Sewage Treatment Plant (CFA 691)
 - Initial Engine Test Facility (TAN IET)
 - Auxiliary Reactor Area (ARA)
 - Test Area North Prep Facility
 - Test Area North Hot Shop
 - Test Reactor Area Filter Pits
 - Advanced Reactivity Measurement Facility/Coupled Fast Reactivity Measurement Facility (TRA 660 ARMF/CFRMF)

GammaCam



- Remote radiation survey
- Decreases cost by 18%
- 2.7 times faster
- Reduces radiation exposure
- AIL Systems, Inc.

Concrete Crusher



- Rubbelizes concrete for recycling
- Decreases cost by 49%
- Excel Recycling & Manufacturing, Inc.

Issues

- Pipe explorer cancellation

Impact on End Users

- Unsolicited deployments by EM-40
 - Snap Together Scaffolding (INEEL CFA 691)
 - Oxy-gas Torch (INEEL STF & IET)
 - BROKK (INEEL STF & IET)
 - Soft-sided Container (INEEL RWMC)
 - Track-mounted Shear (FEMP STP)
- EM-40 D&D operations turn to us for technology and planning recommendation
- Accelerated schedules

Performance Results - FEMP

FEMP ID&D Schedule Acceleration

ASTD Site and Facility	Original Planned Completion Date	ASTD Completion Date	Deployment Status
FEMP 38A	July 1999	August 1998	Completed
FEMP 38B	July 1999	August 1998	Completed
FEMP 24B	July 1999	September 1998	Completed
FEMP 3F	January 2001	September 1998	Completed
FEMP 3G	January 2001	September 1998	Completed
FEMP 8F	June 2001	December 1999	Completed
FEMP 45B	June 2001	December 1999	Completed
FEMP 39C	April 1999	December 1999	Completed
FEMP 22A	April 1999	December 1999	Completed

Performance Results - INEEL

- Soft-sided Container cost savings

To date	\$113K
---------	--------

Predicted for FY-99	\$272K
---------------------	--------

Total	\$385K
-------	--------

- Snap Together Scaffolding
- Oxy-Gasoline Torch
- GammaCam

Project Status

- FY-98 budget: \$882K
- Cost variance: Underspent 18% (\$81K)
- Schedule variance: Behind schedule 11% (\$58K)
- Variance explanation:
 - BROKK brake repair
 - D&D schedule moved
 - Pipe Explorer cancellation

Future Plans

- Continue deployments at INEEL and Chicago
- Complete fact sheets, year-end, and final reports
- Produce video showing use of these technologies at the selected sites or projects
- Analyze data and produce a cost and performance report for each technology deployed
- Identify and facilitate deployment of these technologies at other DOE sites
- Bioremediation at Chicago building 301 hot cells